

Application No. 09/449,215

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons which follow.

Claims 8-10 are currently requested to be cancelled without prejudice. (Claims 4-5, 15-16, and 24-25 were previously cancelled.)

Claims 1, 14, and 23 are currently amended.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, are presented, with an appropriate defined status identifier.

DETAILED ACTION

In section 3 of the Examiner's Advisory Action, the Examiner retained the rejection of claims 1-3, 6-14, 17-23, and 26-32. The Examiner stated:

Applicants argue (page 11) that their claimed invention (claims 1, 14, and 23) differs from the prior art because "neither Wood nor Alvarez, alone, or in any proper combination, discloses, teaches, suggests, or provides any motivation for an image management system in which two dimensional images that are stored on PACS server are communicated to a PACS workstation and a 3D rendering is performed on the PACS workstation." As noted in the previous office action, Wood teaches a medical image management system in which two-dimensional medical images are stored on an image server, and are communicated to an image workstation, and 3D rendering is performed on the image workstation.

The Examiner admits that Wood fails to specify that the image server is a PACS server and the image workstation is a PACS workstation. However, PACS systems (servers and workstations) were exceedingly well known in the art, and commonly used to enable medical facilities to streamline patient information and cut the enormous costs associated with film development and courier

Atty. Dkt. No. 070191-0237 (15-IS-5290)

Application No. 09/449,215

fees. PACS systems were comprised of image servers and image workstations that included the functions of archiving and communicating medical images. As noted in the previous office action, Alvarez teaches a PACS server and PACS workstation that is used to view/transmit ultrasonic images for 3D rendering (col. 6, lines 22-29). In response to the applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Wood and Alvarez are both concerned with management (viewing, archiving, communicating) of ultrasound images, and provide a system that includes image servers and workstations for constructing three-dimensional renderings for diagnostic purposes. Woods' server is connected to access ultrasonic images and reports, and makes them accessible to a personal computer, terminal or workstation at a remote location (Wood, col. 3, lines 20-24). Alvarez's PACS system increases flexibility by allowing older systems to access the images on the image server (Alvarez, col. 6, lines 22-29). The ordinary artisan would have been motivated to combine the teachings of Wood and Alvarez in order to provide a system that can interact with a plurality of medical imaging workstations, thereby increasing efficiency and flexibility. Therefore, it would have been obvious to combine the teachings of Wood and Alvarez so that the two dimensional images are stored on a PACS server, and are communicated to a PACS workstation, and 3D rendering is performed on the PACS workstation.

Applicants further argue (page 12) that "the (conventional) stand alone workstations were set up to perform 3D rendering", and that "the stand alone workstations were not PACS workstations". As disclosed above, PACS workstations were comprised of image workstations that were utilized for medical image archiving and communications. Wood and Alvarez both teach systems that include servers and workstations for archiving and communicating medical images. Therefore, the combination of Wood and Alvarez

Atty. Dkt. No. 070191-0237 (15-IS-5290)

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Received from <4143197016> at 5/12/03 2:53:04 PM [Eastern Daylight Time]

Application No. 09/449,215

still appears to be applicable to the claims invention (claims 1, 14, and 23).

Regarding independent claims 1, 14, and 23, all of the claims recite in some form that the PACS server communicates two-dimensional image information to a PACS workstation. At the PACS workstation, the two-dimensional image slices are compiled, via software provided on the PACS workstation into a three-dimensional image rendering by at least one of multi-plane reconstruction (MPR), multi-plane volume reconstruction (MPVR), and maximum intensity pixel (MIP) projection. The three-dimensional image renderings are compiled from the two-dimensional image slices. Once the three-dimensional image renderings are derived at the PACS workstation, the three-dimensional image rendering is communicated back to the PACS server for storage as a three-dimensional image rendering file thereon. Further, in claims 1 and 14, the two-dimensional image information files are initially stored in one of a DICOM3 or DEFF format on the PACS server.

PACS workstations, prior to Applicants' invention, were not used for three-dimensional image rendering. PACS workstations were designed to retrieve, store, and display two-dimensional image slices and to provide information about the two-dimensional image slices. Further, because PACS workstations were not configured to perform three-dimensional image rendering, PACS workstations were therefore not contemplated to communicate three-dimensional image rendering files back to a PACS server for storage thereon. Accordingly, there is no teaching, suggestion, or motivation in either of Wood or Alvarez to apply three-dimensional image rendering on a PACS workstation and then communicate the three-dimensional image rendering file back to the PACS server for storage thereon.

PACS workstations inherently were devised to handle two-dimensional image slices and were not configured to provide three-dimensional image rendering, to develop three-dimensional image rendering thereon, and communicate such three-dimensional image renderings to a PACS server for storage thereon. Three-dimensional image rendering of two-dimensional image slices is a complex task which was not contemplated by those of ordinary skill in the art for providing

Atty. Dkt. No. 070191-0237 (15-IS-5290)

Application No. 09/449,215

and developing three-dimensional image renderings on PACS workstations. Thus, it was not obvious to those of ordinary skill in the art at the time of Applicants' invention to create three-dimensional image renderings on PACS workstations because they were designed primarily for two-dimensional slice viewing, communication, and archiving, not for complex three-dimensional image rendering and manipulation. Because developing three-dimensional image renderings on a PACS workstation was not known to those of ordinary skill in the art, communicating a three-dimensional image rendering file from a PACS workstation back to a PACS server for storage thereon of the three-dimensional image rendering file was inherently not known, taught, or suggested by the prior art.

Although Wood may disclose a system in which three-dimensional image renderings are developed, Alvarez teaches that three-dimensional image renderings are developed on workstations which are dedicated to three-dimensional image rendering. Prior to Applicants' invention, in fact, Applicants themselves used systems in which three-dimensional image renderings were developed on stand alone workstations that were dedicated for three-dimensional image rendering. Such dedicated workstations did not have the ability to communicate the three-dimensional image rendering file back to a PACS server. Applicants realized that advantages in ease of use and efficiency were available by providing application software on the PACS workstation in which three-dimensional image renderings may be developed, viewed, and manipulated, and then communicated to a PACS server for storage and archiving. Further still, although Alvarez describes a system of PACS workstations and servers, Alvarez does not teach that 3D images could be rendered on a PACS workstation and communicated over a communication network to a PACS server. If Applicants' invention were obvious, Alvarez would have referred to three-dimensional image rendering on PACS workstations, at least in passing, as well as communicating such image rendering files to a PACS server for archiving. No mention, in either Wood or Alvarez, of the desirability of 3D image rendering on a PACS workstation and communicating the 3D image rendering file to a PACS server, is provided. Thus, there is no motivation provided in Alvarez to provide three-dimensional image rendering on a PACS workstation. Accordingly, it was not obvious at the time the invention was made by

Atty. Dkt. No. 070191-0237 (15-IS-5290)

Application No. 09/449,215

Applicants, that 3D image rendering of two-dimensional image slices received from a PACS server could be rendered in three-dimensional form on a PACS workstation and then communicated to a PACS server. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fitch, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Here, neither Wood nor Alvarez has shown any desirability or incentive to make the combination. Therefore, independent claims 1, 14, and 23 and their respective dependent claims are not rendered obvious by Wood in view of Alvarez and are therefore allowable.

Further, independent claims 1, 14, and 23 all require a combination in which the 3D image rendering is developed on a PACS workstation and communicated back to a PACS server. The 3D image rendering is done by at least one of multi-plane reconstruction, multi-plane volume reconstruction, and maximum intensity pixel projection. Accordingly, none of the references, nor any combination of the references, disclose the combination of performing a 3D image rendering on a PACS workstation by one of the listed techniques and then communicating the 3D image rendering to the PACS server for storage thereon. Further, if it can be shown that a combination of references provides these elements, there is no motivation provided in the currently cited references which provide any motivation for the combination or for the desirability of making the combination.

Further still, independent claims 1 and 14, in combination with the other elements previously discussed, further require that the two-dimensional image slices be in one of DICOM3 or DEFF format. None of the references cited provide any such combination of elements nor do any of the references provide any motivation for the combination of elements recited in claims 1 and 14. Accordingly, as stated previously, independent claims 1, 14, and 23, and their respective dependent claims, are therefore allowable.

After amending the claims as set forth above, claims 1-3, 6-7, 11-14, 17-23, and 26-32 are now pending in this application.

Atty. Dkt. No. 070191-0237 (15-IS-5290)

Application No. 09/449,215

Applicants believes that the present application is now in condition for allowance.
Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 06-1447.

Respectfully submitted,

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Atty. Dkt. No. 070191-0237 (15-IS-5290)

-13-

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